	CAS Target Same as/ Near Surface Target	CAS Target Distance From Surface Target	CAS Target Along Gun-Target Line
High/Medium Altitude Attack	Altitude Separation	Altitude Separation	Altitude and/or Lateral Separation
Low/Very Low Altitude Attack	Time Separation	Altitude or Lateral Separation	Altitude and/or Lateral Separation

Figure 3-10. Separation Techniques.

COORDINATED OPERATIONS

A joint air attack team (JAAT) operation is a coordinated attack against one target by attack helicopter units and fixed-wing attack aircraft, normally supported by artillery or NSFS. Terminal controllers may perform duties from airborne positions. JAAT planning considerations and employment methods are discussed in MCRP 3-23A, *The Joint Air Attack Team*.

SECTION III. REQUESTING AND TASKING

MAGTF COMMANDER'S GUIDANCE

The MAGTF commander provides guidance on the use of aviation to accomplish the mission. The MAGTF commander's guidance relating to aviation tasks will focus the efforts of subordinate commanders and staffs. The amount of air support that will be dedicated to CAS is decided by the MAGTF commander in the air apportionment decision. The MAGTF commander's air apportionment decision is normally based on the recommendation of the ACE commander. As part of the air apportionment decision, the MAGTF commander may identify CAS priorities by geographic area or by percentage. The translation of the apportionment decision into total numbers of sorties by aircraft type is the allocation process and is the responsibility of the ACE commander. The ACE commander considers the JTARs submitted, then estimates the number of sorties required to attack each CAS target. The ACE allots sorties for CAS based on the support required by the main effort, priorities of fire, and requests submitted by other units.

CLOSE AIR SUPPORT REQUESTS

As the requesting commander plans and conducts operations, situations are identified where CAS can be employed to enhance mission accomplishment. The requesting commander submits either preplanned or immediate CAS requests. Once CAS is approved, it will be coordinated and integrated into the scheme of maneuver and fire support plan of the requesting unit.

Preplanned Requests

- **Process.** Commanders normally request CAS to augment organic supporting fires. CAS requirements identified early enough to be included in the ATO or mission order are forwarded as preplanned requests. Some preplanned requests may not include detailed target information or timing information because of the longer lead time involved. Once determined by the requesting unit, information such as potential targets, desired effects, timing, and priority are submitted to prepare the ATO. Air officers and operations officers at all echelons must ensure that necessary information is forwarded through the FSCC as soon as it is made available by their respective echelon's planners and commanders. The important consideration in preplanning CAS is for requesting forces to forward their requests early–as soon as they anticipate the need for CAS—and then regularly update and refine their requests as the support time approaches.

- **Procedures.** Units requesting preplanned CAS submit JTARs through their fire support coordination agencies (FFCCs, FSCCs, or rear area operation centers (RAOCs)). Commanders, AOs, and FSCs at each echelon evaluate and consolidate requests, and coordinate requirements (such as airspace, fires, and intelligence). If the request is approved, a priority and precedence is assigned. The FSC then forwards approved requests to the next higher echelon. If a request is disapproved at some level, the request is returned to the originator with an explanation or a substituted fire support asset. The senior fire support coordination agency in the force approves and prioritizes requests. The prioritized requests are then sent to the MAGTF commander for approval. After approval, these consolidated requests become the commander's request for CAS. The senior fire support coordination agency sends the requests to the Marine TACC for planning and execution. The Marine TACC publishes the daily ATO, which includes approved CAS missions. The Marine TACC distributes the ATO to other MACCS agencies and the MAGTF. (See figure 3-11.) In joint operations, the JFACC publishes and distributes the ATO. The TACC prepares the Marine forces' portion and forwards it to the JFACC to be merged with the ATO.

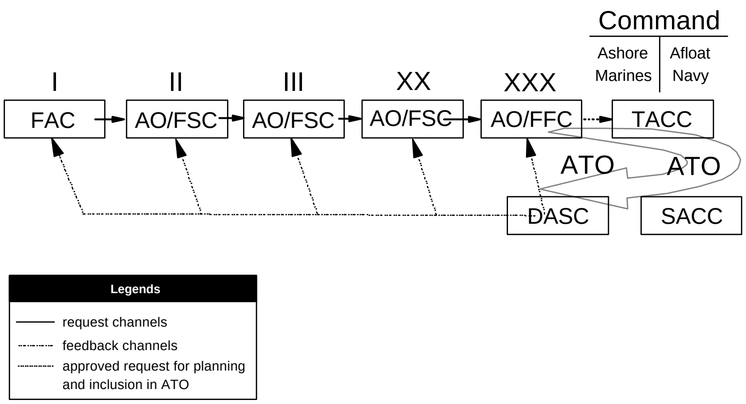

Figure 3-11. Preplanned Close Air Support Request Channels.

Note: Before commencing operations, MAGTFs should develop

numbers are assigned to subordinate units. The use of predetermined numbers allows requesting units to follow their request from initiation to execution. The request number stays with the request as it is processed through the FSCCs to the TACC. The published ATO includes the request number. Once the supported unit contacts the DASC, the DASC will contact the aircraft and provide routing and other required information.

- **Categories.** Preplanned requests are categorized as either scheduled or on call.

  - **Scheduled Requests.** Scheduled requests require the requesting unit to identify the target and the desired TOT well in advance. The TACC assigns aircraft to meet the scheduled TOT. Scheduled requests offer greater opportunity for effective coordination and provide a higher likelihood that the aircraft will have the proper weapons load for the assigned targets. Scheduled air support requires the requesting commander to identify a specific target and time for the attack beforehand, so that after launch only minimum communications will be necessary for final coordination. However, this specification is often difficult on a fluid battlefield.

  - **On-Call Requests.** On-call requests identify an anticipated requirement for CAS to be available during a period of time, but the exact time and place is coordinated as the battle develops. On-call CAS allows the requesting commander to indicate a time frame, probable target type, and place where the need for CAS is most likely. On-call aircraft are configured with the proper ordnance for anticipated targets, and normally maintain an alert status. Requesting units must be specific as to the location and the duration of the on-call mission. If aircraft are to operate from a forward location, consideration should be given to providing security for the aircraft and allowing for communications with the DASC. On-call requests can indicate the responsiveness necessary by specifying either ground or airborne alert. The TACC then places aircraft on alert in the requested manner for the period specified on the JTAR.

Immediate Requests

- **Process.** Immediate requests arise from situations that develop once the battle is joined with the enemy. Requesting commanders use immediate CAS to exploit opportunities or protect the force. Because immediate requests respond to developments on a dynamic battlefield, they cannot be identified early enough to allow detailed coordination and planning. This may preclude the optimum ordnance load for the particular targets to be attacked. If CAS aircraft are unavailable, the DASC may request the TACC to divert lower priority missions to fill CAS requirements. When diverting aircraft from preplanned CAS missions, it should be realized that those units that have requested preplanned CAS lose the same amount of firepower gained by the immediate requester, if the immediate request is approved. The mission and commander's intent may necessitate the requirement to divert CAS sorties and forgo preplanned missions to meet certain immediate requests.

- **Procedures.** Requests are broadcast directly from the TACP to the DASC using the TAR net. The AOs in each FSCC monitor the TAR net. The DASC processes requests for immediate missions and coordinates with the senior FSCC. Each FSCC will either approve or deny the request based on the commander's intent and after considering whether organic assets are available, appropriate, or sufficient to fulfill the request. Two options are available for subordinate FSCCs to signify approval of requests. Subordinate FSCCs may provide positive verbal approval of each request or may use silence as the consent procedure. If coordination is required for approval, the FSCCs will coordinate at the lowest possible level. If a request is disapproved at some level, the request is returned to the originator with an explanation or a substituted fire support asset. The DASC assigns aircraft according to the type of mission and the terminal control agency's capabilities. For ground alert aircraft, the TACC may retain launch authority or delegate it to the DASC. If the DASC has launch authority, it launches the aircraft and directs aircrews until they contact the terminal control agency. If the DASC does not have launch authority, it contacts the TACC to launch the aircraft. (See figure 3-12.)

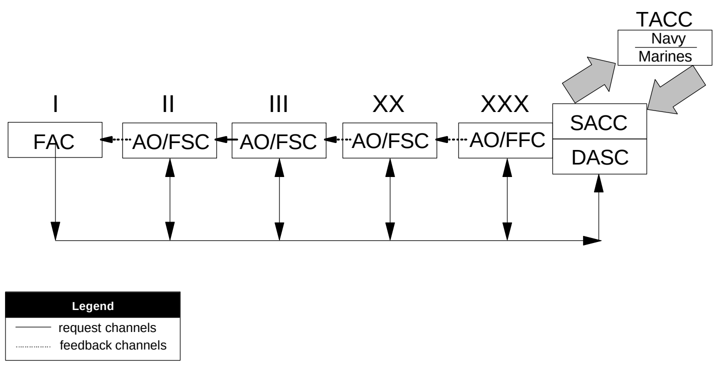

Figure 3-12. Immediate Close Air Support Request Channels.

CLOSE AIR SUPPORT REQUESTS AFLOAT

The following paragraphs address requesting CAS while the Navy TACC controls air support and the SACC has responsibility for coordination.

- **Preplanned Requests.** Units requesting preplanned CAS proceed through the chain of command to the landing force AO. At lower echelons, unit AOs combine and integrate requests with those for NSFS and artillery to reduce duplication and coordinate the fire support effort. The landing force operations officer examines the combined and coordinated fire plan to confirm that it supports projected operations. After approval by the landing force operations officer, the landing force AO submits these documents to the Navy TACC for approval and coordination with other projected air operations within the AOA. If CAS requirements exceed available assets, the commander, landing force (CLF), recommends priorities for the requests.

- **Immediate Requests.** Units requesting immediate CAS send requests to the ASCS on the TAR net. The air support controller receives, processes, and records these requests. The air support controller coordinates these requests with other members of the SACC. The air support controller informs the requesting unit of request approval and approximate time of execution.

JOINT CLOSE AIR SUPPORT REQUEST PROCEDURES

Units requesting preplanned CAS submit JTARs to their normal fire support coordination agencies. If approved, the requests are evaluated, coordinated, consolidated, and forwarded through component communications nets, with an assigned priority and precedence. If a request is disapproved at some level, the request is returned to the originator with an explanation or a substituted fire support asset. In the Marine Corps component, for example, the FSCC/FFCC of the highest maneuver echelon in the force prioritizes the requests and submits them to the MAGTF commander for approval. After approval, these consolidated requests become the MAGTF commander’s requirement for CAS. If the total of all CAS requests exceeds the MAGTF’s organic capability, those requests that cannot be met are forwarded to the JAOC via the air support request (AIRSUPREQ) message.

- At the JAOC, the JFACC/JFC staff reviews the requests, matches them in priority order against the JFC's air apportionment decision, and fills those requests with the sorties available according to the air apportionment guidance. The MAGTF is then notified of approval/disapproval via the sortie allotment (SORTIEALOT) message.

- If requests exceed the joint air apportionment for CAS, the JFACC/JFC staff must ask the JFC to modify the CAS air apportionment, request components to produce more joint CAS sorties, or deny the requests exceeding the joint air apportionment for CAS.

- During the execution phase of the joint ATO, the JFACC/JFC staff may need to redirect joint air missions to meet immediate requests for high priority CAS. The JFACC/JFC staff may also seek additional support from other components to meet the immediate request.

- Immediate requests are forwarded to the appropriate command post by the most rapid means available. Requests are broadcast directly from the TACP to the air support operations center by using the applicable component communications nets. The AO at each intermediate headquarters monitors the request and informs the operations officer and FSC. Based on the commander's intent and after considering whether organic assets are available, appropriate, or sufficient to fulfill the request, they approve or deny the request. Either positive approval or silence by intermediate headquarters, whichever is in effect, will indicate approval. See Joint Pub 3-56.1 and Joint Pub 3-09.3, for an expanded discussion.

REQUEST FORMAT

Units will use the JTAR voice format when requesting CAS. See Appendix D, Joint Tactical Airstrike Request Form, for an illustration and the complete instructions.

MISSION DATA

For preplanned requests, mission information is relayed through GCE communications channels, normally over the TAR net. Data may be included in the joint ATO, mission order, or fire support plan. For approved immediate requests, mission data is relayed through the same air request net as that used by the unit requesting the immediate mission. Mission data is passed using the JTAR section 3 format to the requesting unit. As preplanned requests are submitted and refined, as much information as possible concerning the supported unit commander's intent, scheme of maneuver, control measures, and fire support plan should be included. At a minimum, mission data will include mission number, call sign, number and type of aircraft, ordnance, estimated TOT/time on station (TOS), CP, initial contact (whom the aircrew contacts first), and call sign and frequency of final control agency.

SECTION IV. NIGHT/ADVERSE WEATHER CLOSE AIR SUPPORT PLANNING

The execution of night CAS is one of the most difficult missions on the battlefield. Ground forces, both friendly and enemy, conduct operations around the clock. Therefore, the requirement exists to provide CAS at night, during periods of limited visibility, or under adverse weather conditions. Successful night and adverse weather CAS demands rigorous training and detailed mission planning, as well as solid communications and procedural discipline. Aircraft and aircrews conducting night CAS employ modern NVDs, IR pointers, laser systems, battlefield illumination, and standard procedures.

BASIC CONSIDERATIONS

Advantages

The most important advantage of night and adverse weather CAS is the limitation it imposes on enemy optically-directed antiaircraft artillery and optical-/IR-guided SAMs. This advantage is greatest if the enemy air defense operators do not possess NVDs. Selectively placed airborne and ground illumination may further degrade enemy night vision capabilities while preserving or enhancing those of friendly forces. As an example, overt airborne illumination flares, selectively placed at a distance well behind and above friendly positions (so as not to silhouette friendly positions), could be employed to “degain” enemy NVDs, to improve insufficient light conditions, and to counter enemy IR-guided SAMs. Radar-directed threat systems may remain as lethal at night as in daylight, but gun muzzle flashes, tracers, and missile/rocket motors are generally easier to see and react to at night.

Disadvantages

Darkness and weather can impose several limitations on CAS employment. During periods of low illumination and reduced visibility, both CAS aircrews and ground forces may have difficulty pinpointing targets and accurately locating enemy or friendly forces. Night and adverse weather CAS missions may also require greater TOS. Thus, fuel capacity and combat radius may be important considerations when tasking aircraft for night CAS. Twilight and overcast conditions may also highlight aircraft to enemy ground forces. If planners have the option, dawn and dusk missions should be avoided in favor of missions flown in total darkness.

Friendly Force Location and Identification

Perhaps the single most important task in conducting CAS is correctly locating and identifying friendly ground forces in close proximity to the intended target. The challenges of identifying friendly and enemy locations, acquiring targets, and maintaining situational awareness become acute at night or in an adverse weather environment. The training, equipping, planning, tasking, and execution processes must recognize these challenges and establish proper CID procedures.

AIRCRAFT MUNITIONS AND EQUIPMENT SELECTION

CAS planners should select those combinations of munitions and aircraft that offer the greatest accuracy, firepower, and flexibility.

When possible, NVD-equipped aircraft that are compatible with laser or IR marking/designation systems and munitions should be used. (See Appendix C.)

- **Precision-Guided Munitions (PGMs).** PGMs are the most accurate munitions for day or night CAS. PGMs span the entire spectrum of delivery means, including fixed- and rotary-wing aircraft, artillery, and naval guns. PGMs include laser-guided, IR-guided, and radar-homing weapons. Hazards associated with PGMs relate to the unlikely probability of missile malfunction, which accounts for the large surface danger zone for this type of ordnance. Overall, the circular error probable (CEP) for PGMs is much smaller than for general-purpose or cluster bomb munitions. Some PGMs, such as the laser Maverick, have a safing feature in case the missile's guiding laser energy is lost.

- **Equipment Selection.** Systems to identify and mark friendly positions or mark/designate targets are important (e.g., IR pointers, IR tape, GPS, and laser target designators (LTDs)). When possible, terminal controllers, FAC(A)s, and CAS aircraft should be equipped with such systems, and the ground force systems should be compatible with those on the CAS aircraft.

- **Equipment Compatibility.** Figure 3-13 compares laser equipment compatibility to other systems relative to the operating areas of the electromagnetic spectrum. As illustrated, compatibility exists only between LTDs and laser spot trackers (LSTs). All coded LTDs can work with all coded laser acquisition/spot trackers and coded laser-guided weapons (LGWs). Likewise, IR pointers and night vision goggles (NVGs) are compatible only with each other. IR pointers cannot designate for LSTs, and NVGs cannot see targets designated by LTDs. Forward-looking infrared (FLIR) systems are not compatible with either laser or IR equipment.

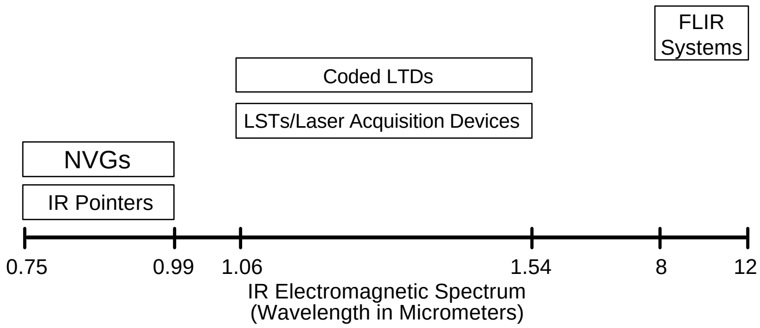

Figure 3-13. Laser Equipment Compatibility.

VISUAL EMPLOYMENT

Visual deliveries during night or adverse weather are difficult, but are still a viable option. Artificial illumination may be used to enhance target acquisition. The target may be illuminated or marked by the FAC(A), artillery/mortars, small arms, or by a dedicated flare ship. Airborne delivered marks/illumination may be provided by forward firing rockets or by using parachute flares. Coordination and approval for illumination will be made before entering the target area. Artillery-, mortar-, and airborne-delivered flares that burn on the ground are available as target spotting rounds. After the target area is illuminated, specific targets may be marked by white/red phosphorous rockets, mortars, or artillery to aid the aircrew in acquiring, identifying, and attacking these targets.

SYSTEM-AIDED EMPLOYMENT

System-aided target acquisition and weapons delivery methods are relied on more heavily during the night and adverse weather. System-aided employment options can be used independently, but combining the systems increases the probability of mission success. These include laser, electro-optical (EO)/IR systems, radar, GPS, or a combination of systems.

- **Laser.** Night procedures for target identification and designation by laser are the same as those used during daytime operations. However, adverse weather may limit the use of lasers. Cloud cover and precipitation, as well as battlefield conditions (smoke, dust, haze, specular reflectors, and other obscurants), can seriously degrade laser effectiveness. Using the EO tactical decision aid (EOTDA) will help planners to determine the effects of weather on sensors and weapons. See Joint Pub 3-09.1, *Joint Laser Designation Procedures*, for further information.

- **EO/IR Systems.** The capabilities of low-light-level television (LLLTV) and FLIR systems are the same for day as they are for night. Cloud cover, humidity, precipitation, thermal crossover, and battlefield conditions (smoke, dust, haze, and other obscurants) may degrade the effectiveness of FLIR and LLLTV.

- **Radar.** Although not preferred, radar deliveries are an option in certain instances. During severe weather or when the target cannot be marked, this type of weapons delivery may be the only option available. Appendix C lists the aircraft that are capable of radar-directed bombing. To perform a radar delivery, the target or offset aim point(s) must be radar significant.

- **GPS.** Weapons can be delivered at night or through bad weather at specific coordinates by GPS-equipped aircraft. When supplied with GPS coordinates by terminal controllers, computed deliveries can be extremely accurate.

- **Combined System Employment.** The use of a combination of complementary systems can greatly aid and refine target acquisition. A GPS-derived target grid and laser spot, combined with an aircraft equipped with an LST and the ability to input the target grid into its fire control system, can provide very accurate target location information.

NIGHT VISION DEVICE EMPLOYMENT

NVDs include NVGs and IR systems. NVGs and IR systems (e.g., FLIR systems) and low-altitude navigation and targeting IR for night (LANTIRN) may provide the primary navigation, targeting, and terrain avoidance reference for the night CAS mission. NVGs and IR systems operate on the same basic principle by using the red and near-IR regions of the light spectrum to produce a visible image. NVGs feature image intensifier tubes that produce a bright monochromatic (green) image in light conditions that are too low for normal unassisted vision. This image is based on the relationship between the amount of light present, referred to as illuminance, and the amount of light that is reflected from objects in the scene, referred to as luminance or brightness. IR systems use the far-IR wavelengths to create an image that is based on object temperature and emissivity relative to the surroundings.

Advantages

NVDs are used as an additional sensor with existing systems; this allows all NVD-equipped ground and air units to maintain enhanced situational awareness and crew confidence levels. NVDs, used under the proper weather and illumination conditions, provide the ability to "see in the dark" and to allow target detection, recognition, and attack at night. This enhances the elements of surprise and survivability in all threat environments. Ground forces (especially special operations forces (SOF)) benefit from the smaller, lightweight NVD equipment by providing pre-H-hour and H-hour methods of attacking targets, along with CAS target marking. NVDs and associated IR devices can play a key role in minimizing the risk of fratricide when employed to enhance situational awareness of friendly and enemy positions.

Disadvantages

Reduced illumination levels caused by the moon phase, weather, or battlefield obscurants may degrade the ability to effectively employ NVDs without artificial illumination. Under certain conditions, reduced illumination levels may be mitigated by properly placed artificial illumination sources. Used improperly, the limited field of view of NVGs can lead to loss of situational awareness, given the increased task workload demanded for CAS missions. Extensive training for all units is required to ensure mission success. Additional disadvantages may exist if the enemy possesses NVDs, thus limiting or even negating friendly use. Decoy and deceptive lighting can easily be employed, but this can cause confusion for the aircrews if the terminal controller cannot communicate the correct lighting marks to CAS aircraft.

Planning Considerations

NVDs can significantly increase the capability of ground and airborne units to detect ground targets in a night CAS environment. Certain natural conditions determine the aircrew's ability to acquire the target visually. NVDs are particularly useful for increasing situational awareness and in some instances can be used for target acquisition.

- **Moon Phase, Elevation, and Azimuth.** The moon phase, or percent of moon disk as a fraction of the full moon, is the most significant night illumination factor. A full moon provides considerable lighting for NVDs. The elevation of the moon and its relative azimuth in the night sky also play a significant role. Low moon angles can create significant shadowing, and moon positions that lay behind a target and are reciprocal to final attack headings may degrade NVD operations. Moon elevations of 20 degrees or more and moon offsets of 30 degrees or more may be required to prevent NVD degradation.

- **Mean Starlight.** Light from nonmoon celestial sources provides limited illumination and on relatively clear nights will suffice for general situational awareness. Depending on the target size and orientation, there may not be enough light under mean starlight conditions for target acquisition.

- **Weather Conditions.** Cloud cover, cloud base height, and reduced atmospheric visibility significantly degrade any benefits provided by moon and mean starlight illumination. The same conditions may also degrade IR target sources.

- **Cultural Lighting.** Light sources (e.g., city lights, highway lighting, and other sources, such as fires) provide lighting that can help with general illumination. Extremely bright light sources will wash out the NVD field of view when viewed directly.

TARGET IDENTIFIERS

IR devices and illumination can be used to aid in specific target location and acquisition at night. Both can significantly increase the effectiveness of CAS accuracy in the night environment. Additionally, IR devices can provide a covert means to mark night CAS targets. IR devices can also be used by FAC(A)s to guide NVD-equipped CAS aircraft to targets.

- **IR pointers.** IR pointers are low-power, uncoded designators used for target cueing and identification in conjunction with NVDs. They do not provide terminal weapons guidance and they are not compatible with LSTs. These systems operate in the lower portion of the IR spectrum and are compatible only with NVDs. Aircraft and ground personnel operating with NVDs use IR pointers to visually acquire targets. IR pointers or IR illuminators can aid in target acquisition by highlighting the target with IR light. The IR pointer should be offset from the aircraft run-in heading to facilitate aircrew acquisition. Moving the pointer beam will also help in acquisition of the beam, and once acquired, the FAC can guide the pilot’s eyes and sensors onto the intended target. Two-way communication between the FAC and aircrew during this process is essential.

- **IR Strobe Lights.** IR strobe lights can be used by FACs and by properly equipped aircraft to provide covert position identification to NVD-equipped personnel. This provides positive location of the FAC and/or friendly forces to CAS aircrews.

- **IR Flares.** IR flares can provide general target area illumination that is visible only to NVD-equipped personnel and can be useful from several miles away.

- **Airborne Illumination.** Many aircraft that are capable of providing CAS can deploy illumination flares. The aircraft capabilities tables in Appendix C list flare-capable aircraft and the types of flares/illuminating devices each can carry.

- **Surface-Delivered Illumination.** Illumination can be delivered by ground units, artillery, mortars, and naval gunfire to illuminate the target area, to mark the target, or to identify friendly positions.

- **Laser Designators (Ground/Airborne).** Coded LTDs are ground and airborne systems that are well suited for night target marking. LTDs provide terminal weapons guidance for LGWs, and they designate targets for coded LSTs. Coded LTDs emit laser energy at a distinct pulse repetition frequency (PRF), and they require input of a particular laser code for operation. Codes are assigned to LGWs and directly relate to the PRF that harmonizes the designator and seeker interface. The aircraft capabilities tables in Appendix C list aircraft equipped with LTDs.

- **Radar.** Aircraft can use radar-significant terrain points or radar reflectors to enhance bombing. The radar beacon, employed by terminal controllers, is a portable manpack transponder that emits an electronic pulse on compatible radar-equipped aircraft. Appendix C lists radar beacon-compatible aircraft.

- **Enemy Ground Fire.** Enemy ground fire, tracer rounds, AAA, and SAM firings can disclose targets.

- **Friendly Small Arms.** Tracers that impact on or near the target are excellent marks. However, tracers may also help confirm friendly positions.